

REMARKS

Claims 1-7, all the claims pending in the application, stand rejected. Claim 8 has been added.

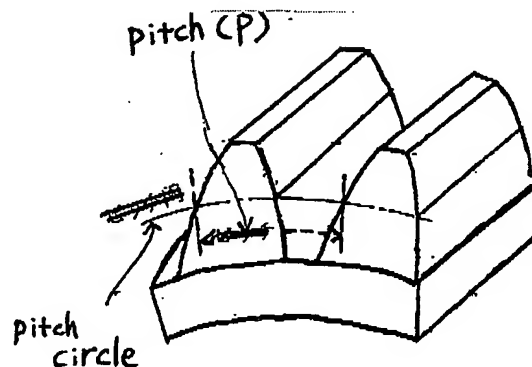
Claim Rejections - 35 U.S.C. § 112

Claim 2 is rejected under 35 U.S.C. § 112, second paragraph as being indefinite. This rejection is traversed for at least the following reasons.

The Examiner observes that claim 2 uses the term “module”. The Examiner asserts that the term is indefinite because it is (1) not defined in the claim, (2) not defined in the specification or (3) otherwise used in connection with a standard that may allow an understanding of its meaning, and (4) would not be understood by one skilled in the art in connection with the present invention.

In this regard, Applicant first notes that the term “module” appears in the specification at page 5, first full paragraph and page 6, second full paragraph. Applicant also notes that this term is widely used and well known in the filed.

The definition of the term “module” appears in the Japanese language technical dictionary “Kikai no Jiten” (Dictionary of Mechanical Terms) published by Asakura Shoten in 1980, based on the following illustration of a portion of a toothed gear.



According to the definition, Z is the number of teeth, and D is the pitch circle diameter, circular pitch (p) is indicated as $(\pi D/Z)$. As π is not a rational number, it is not convenient for

use as a gauge representing the size of the teeth. Accordingly, the parameter (D/Z) with π removed is defined as the “gauge.” D expressed in mm units is divided by Z and the resulting figure is called the “module.”

On the basis of the foregoing explanation, the claim is clear and definite to one skilled in the art.

Claim Rejections - 35 U.S.C. § 103

Claims 1-3, 5 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanazawa et al (JP 06-033804 A) in view of Kamimura et al (5,868,114). This rejection is traversed for at least the following reasons.

As explained in connection with a description of the problems in the prior art design, the invention relates to an intake throttle valve apparatus for an internal combustion engine, where the design is compact and adapted for use with engines having a cylinder volume of 1.0 liter or less. In particular, this goal is achieved by implementing a reduction gear mechanism that eliminates an intermediate gear and relies solely upon an output gear that is coupled directly to a motor and meshes with an input gear coupled to a valve shaft. A reduction ratio of the reduction gear train for this arrangement is approximately 10. As explained at pages 5 and 6, the output gear 12 and input gear 13 have a “module” in a range of 0.4-1.0, with the number of teeth in the range of 4-8 and 70-100, respectively. Also, the interaction distance between the motor shaft 11 and the valve shaft 7 is shortened due to the omission of the intermediate gear.

Claim 1 defines the structure of the intake throttle valve apparatus as relying upon a reduction gear mechanism composed of an output gear and an input gear that directly meshes with the output gear. By implication, this eliminates the intermediate gear.

None of references disclose the subject matter of claim 1 that the reduction gear mechanism is composed of an output gear fixedly secured to a motor shaft of the driving motor and the input gear fixedly secured to the valve shaft at one end thereof and directly meshing with the output gear.

Kanazawa et al

The Examiner looks to Kanazawa et al for a disclosure in Fig. 2 of a throttle valve having a reduction gear mechanism 103, where the reduction gear mechanism is composed of an output gear fixed to an electromagnetic clutch 110, which is operatively connected to a motor output shaft. There is no teaching of an output gear that directly meshes with an input gear that is fixedly secured to a valve shaft. Thus, a difference between Kanazawa et al and the claimed invention is that the invention has an output gear fixedly secured to a motor shaft, while Kanazawa et al interposes a clutch.

The Examiner asserts that the omission of an element is obvious, under existing law. In particular, the Examiner asserts it would be obvious to remove the electromagnetic clutch and mount the output gear to the motor shaft. The Examiner refers to Kamimura et al for a teaching, via alternative embodiment Figs. 1 and 2, that an electromagnetic clutch 14 can be omitted and the output gear driven directly.

Kamimura et al

Kamimura et al describes the embodiments in Figs. 1 and 2 as alternatives (col. 2, lines 48-51) and teaches at col. 4, lines 30-42 that the valve element 1 is fixedly mounted to a shaft 3 through a reducing gear means 21, and electromagnetic clutch 14 selectively disconnects the DC motor from the reducing gear means 21. Such structure is not present in the embodiment of Fig. 1, as is clear from the figures. The details of the reduction gear arrangement is provided at col. 6, lines 55-67, where the intermediate gear 25 and smaller gear 22 are interposed between an output gear 23 and an input gear 21. The input gear is shaped in a semi-circular fashion.

The combination of Kanazawa et al and Kamimura et al, however is based purely on hindsight in view of Applicant's own teachings. Kamimura et al teaches the use of an intermediate gear and, thus, teaches away from the present invention and the teachings of Kanazawa et al. One of ordinary skill would not look to Kamimura et al for any teaching because the overall structure is contrary to the goals of the present invention, namely, direct connection between the input and output gears and a reduced size. Use of an intermediate gear and a clutch clearly increases the size of the structure.

A further distinguishing feature is found in claim 2, where the features of the module and number of teeth for each gear are specifically recited. These features are not found in the prior art.

With regard to claim 5, the claim would be patentable on the basis of its dependency from claim 1.

Similarly, with regard to claim 7, the Examiner takes the position that the prior art teaches a gasoline engine whose cylinder volume is 1.0 liter or less. This claim would be patentable because of its dependency on claim 1.

Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanazawa et al (JP 6-033804A) in view of Kamimura (5,868,114) and further in view of Makino et al (4,690,119). This rejection is traversed for at least the following reasons.

Applicant has identified distinguishing characteristics over Kanazawa et al and Kamimura et al, such that the combination of references is overcome. Makino et al does not remedy any deficiency in the other prior art. The Examiner cites Makino et al solely for its disclosure of a valve apparatus wherein the output gear is fabricated by a sintering process (col. 3, lines 42-52).

Claim 6 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanazawa et al (JP 6-033804A) in view of Kamimura et al (5,868,114) and further in view of Torii et al (6,626,421). This rejection is traversed for at least the following reasons.

On the basis of the distinguishing characteristics over Kanazawa et al and Kamimura et al, the combination of references should be overcome. Torii et al does not remedy any deficiency in the other prior art. Torii et al is merely cited for the teaching of a housing that is made of resin, with reference to Fig. 8, lines 35-44.

New Claim

Applicant has added new claim 8, which depends from claim 1 and would be patentable because of that dependency, and because the claim specifies that the reduction ratio is around 10. Applicant notes that the prior art reduction ratio is “substantially greater than 10”.

Amendment Under 37 C.F.R. § 1.111
10/800,721

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

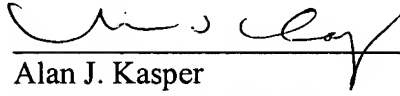
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